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PATENT SPECIFICATION

619,616

No. 37033/46.

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Complete Specification Accepted: March 11, 1949.

Index at acceptance:—Class 106(v), M4(b1b: c2: c3: n: q).

PROVISIONAL SPECIFICATION

Improvements in or relating to Devices for Delivering Liquid in Measured Quantities

We, NON-DRIP MEASURE COMPANY LIMITED, a British Company, and ALBERT GEORGE BERWICK, a British Subject, both of Ellison Works, Danbrook Road, Streatham, London, S.W.16, do hereby declare the nature of this invention to be as follows:—

This invention relates to devices for delivering measured quantities of liquid and to the kind wherein the delivery operation is effected by the application of upward pressure to an axially component through which the measured quantity of liquid flow from a measuring chamber into a receptacle.

The object of the present invention is to provide an improved measuring device of the kind above described in which the air inlet valve occupies a position entirely external to the measuring chamber thereby allowing greater variation in capacity to be effected in the design of the measuring chamber than has been possible hitherto and also enabling a more effective sealing of the inlet to be made during the liquid delivery operation.

According to the invention a device of the kind above described for delivering measured quantities of liquid is characterised by an air inlet valve disposed externally of the measuring chamber and having a valve stem arranged to be operated by an axially movable member to establish communication between the measuring chamber and the atmosphere after the said member has closed the liquid inlet to said measuring chamber.

The invention also consists in a device of the kind above described for delivering measured quantities of liquid wherein an axially movable operating member is arranged during its upward movement first to close the liquid inlet to a measuring chamber, secondly to open an air inlet valve disposed externally of the measuring chamber and lastly to allow discharge of a measured quantity of liquid substantially simultaneously with a secondary closure of the liquid inlet.

In carrying the invention into effect and according to the preferred form thereof the improved device for delivering measured quantities of liquid includes a measuring chamber made in two or more parts for convenience in dismantling the device for cleaning or adjustment. The top of the measuring chamber is formed or provided with known means for connecting it around or within the neck of an inverted bottle or for making a fluid tight connection with any other container or reservoir from which liquid is to be withdrawn intermittently. The head of the measuring chamber may also be formed or provided with means for detachably connecting it to a supporting bracket or like device.

In the base of the said measuring chamber is a central opening forming the upper end of a cylindrical passage in which an axially movable operating member is slidably mounted. The lower end of the operating member conveniently carries laterally extending arms of known form which enable the said operating member to be pushed upwards by means of a receptacle to be charged with a measured quantity of liquid. The inner surface of the base of the measuring chamber surrounding the opening of the said passage is formed as an annular seating with which co-operates a resilient ring carried by the operating member to act in effect as a valve to seal the base of the measuring chamber against leakage while the device is inoperative.

The head of the measuring chamber terminates in a frusto-conical portion surmounted by a short cylindrical chamber whose diameter is greater than that of the inlet passage whose lower end opens into said chamber. Air is admitted to the measuring chamber, when required, through a port, a valve chamber and a second port all formed or arranged within the head of the measuring chamber but completely external to the said measuring chamber itself, the said second port

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opening into the frusto-conical portion at the head of the said chamber. Within the said valve chamber is disposed a movable valve member comprising a stem having flats or flutings formed in part of its length, a cylindrical inner end and a flange with a resilient ring adapted to bear upon a seating formed by the inner wall of the valve chamber through which the cylindrical end of the said stem projets. The valve member is normally maintained in the closed position by means of a spring so as to cut off communication between the first and second ports. The valve stem is movable along an axis at right angles to the axis of the measuring device, that is a horizontal axis when the device is operatively positioned although it may be, if necessary, arranged to operate on an axis slightly inclined to the horizontal. The inner end of the said valve stem is rounded and when at rest projects slightly into the cylindrical chamber above the frusto-conical head of the measuring chamber.

The axially movable operating member has a transverse port or ports communicating with a central discharge passage in its lower end but is otherwise solid and its head is slightly chamfered. The diameter of the upper part of the operating member is such that it forms a close but slidable fit in the cylindrical chamber above the measuring chamber.

The operation of the measuring device above described is as follows:—

When the device is at rest free communication exists between the bottle or other reservoir of liquid and the measuring chamber which is filled with liquid. When the operating member is moved upwards its head enters the cylindrical chamber thereby cutting off the supply of liquid to the measuring chamber. Further movement of the operating member brings its chamfered head into contact with the rounded inner end of the valve stem which is thereby moved axially outwards to lift the resilient valve component off its seating and thereby open communication between the interior of the measuring chamber and the atmosphere through the two ports and the valve chamber. The last part of the travel of the operating member brings its ports above the level of the base of the measuring chamber and allows the liquid to flow out. Also during the last part of said travel the head of the operating member makes contact with the base of the inlet passage and thus makes the measuring chamber doubly secure against inlet leakage during the discharge operation. When the pressure of the receptacle charged is removed the operating member is restored to its initial position by a spring or other resilient device.

Means of known form may be provided externally of the measuring chamber to retain any liquid which tends to leak down the surface of the operating member and for retaining any drips which may form at the discharge opening in the base of the operating member.

Dated this 16th day of December, 1946.

HERON ROGERS & CO.,
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COMPLETE SPECIFICATION

Improvements in or relating to Devices for Delivering Liquid in Measured Quantities

We, NON-DRIP MEASURE COMPANY LIMITED, a British Company, and ALBERT GEORGE BERWICK, a British Subject, both of Ellison Works, Danbrook Road, Streatham, London, S.W.16, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to devices for delivering measured quantities of liquid and to the kind wherein the delivery operation is effected by the application of upward pressure to an axially movable component through which the measured quantity of liquid flows from a measuring chamber into a receptacle.

The object of the present invention is to provide an improved measuring device of the kind above described in which the air inlet valve occupies a position entirely external to the measuring chamber thereby allowing greater variation in capacity to be effected in the design of the measuring chamber than has been possible hitherto and also enabling a more effective sealing of the inlet to be made during the liquid delivery operation.

According to the invention a device of the kind described for delivering measured quantities of liquid includes an air inlet valve actuated by upward movement of an axially movable operating member wherein the inner end of the air valve stem projects into a second chamber

formed above the measuring chamber, the said second chamber which constitutes the liquid inlet to the measuring chamber being closed by initial movement of the operating member which then engages and operates the air inlet valve stem to establish communication between the measuring chamber and atmosphere.

The invention also consists in a device of the kind described for delivering measured quantities of liquid wherein an axially movable operating member is arranged during its upward movement first substantially to close the liquid inlet to a measuring chamber, secondly to operate an air inlet valve which with its operating element is disposed externally of the measuring chamber, and lastly to allow discharge of a measured quantity of liquid substantially simultaneously with a complete closure of the liquid inlet.

Reference will now be made to the accompanying drawings which show a device constructed according to the invention for delivering measured quantities of liquid and in which:—

Fig. 1 is a sectional elevation of the device in the rest position.

Fig. 2 is a sectional elevation showing the device partially operated.

Fig. 3 is a sectional elevation showing the liquid discharge, and

Fig. 4 is an enlarged view of the air inlet valve.

In the construction illustrated, the device for delivering measured quantities of liquid comprises a measuring chamber formed in two parts 1 and 2 with a sealing ring 3 disposed between them. The lower part 2 has an upwardly projecting cylindrical portion 4 which substantially surrounds the upper part 1 which is retained in close sealing engagement with the lower part 2 by a locking member 5 which has screw-threaded engagement with the portion 4 and an inwardly directed flange 6 which bears upon the upper edge of the part 1. The locking member 5 conveniently forms part of a bracket by which the measuring chamber is supported from a fixed standard at a convenient height above a table or counter for dispensing the liquid in measured quantities into glasses or other receptacles. The mode of connecting and supporting the two parts of the measuring chamber enables them to be readily dismantled for cleaning or adjustment.

The top of the measuring chamber is adapted to be connected around or within the neck of an inverted bottle or can be arranged for fluid-tight connection to any other container or reservoir from which liquid is to be withdrawn intermittently. In the form shown the upper part 1 of the measuring chamber has a central passage in which an inlet tube 7 is fitted, the exterior of this tube carrying a coned member 8 of cork or other yieldable material for making liquid-tight connection with the mouth of an inverted bottle. Within the tubular inlet 7 is disposed a baffle 9 in known manner to prevent the flow of liquid being impeded by the formation of bubbles.

In the base of the lower part 2 of the measuring chamber is a cental opening forming the upper end of a cylindrical passage 10 in which an axially movable operating member 11 is slidably mounted. The lower end of the operating member conveniently carries laterally extending arms 12 of known form which enable the operating member to be pushed upwards by means of a receptacle to be charged with a measured quantity of liquid. The inner surface 13 of the base of the measuring chamber surrounding the opening of the passage 10 is formed as an annular seating with which co-operates a resilient ring 14 carried by the operating member 11 to act in effect as a valve to seal the base of the measuring chamber against leakage while the device is in the inoperative position shown in Fig. 1.

The head of the interior of the measuring chamber terminates in a frusto-conical portion 15 surmounted by a short cylindrical chamber 16 whose diameter is greater than that of the inlet passage 7 whose lower end opens into said chamber. Air is admitted to the measuring chamber, when required, through a port 17, a valve chamber 18 and a second port 19 all formed or arranged within the head 1 of the measuring chamber but completely external to the said measuring chamber itself, the second port 19 opening into the frusto-conical portion 15 at the head of the said chamber.

Within the valve chamber 18 (see Fig. 4) is disposed a movable valve member comprising a stem 20 having flats or flutings 21 formed in part of its length, or a reduced diameter for part of its length, a cylindrical inner end and a flange 22 with a resilient ring 23 adapted to bear upon a seating 24 formed by the inner wall of the valve chamber 18 through which the end of the stem 20 projects. The valve member is normally maintained in the closed position by means of a spring 25 so as to cut off communication between the ports 17 and 19. The valve stem is movable along an axis at right angles to the axis of the measuring device, that is a horizontal axis when the device is operatively positioned although it may be, if necessary, arranged to operate on an axis

slightly inclined to the horizontal. The inner end 26 of the valve stem 20 is rounded and when at rest projects slightly into the cylindrical chamber 16 above the frusto-conical head of the measuring chamber, as shown in Figs. 1 and 4.

The axially movable operating member 11 has transverse ports 27 communicating with a central discharge passage 28 in its lower end but is otherwise solid and its head 29 is slightly chamfered. The diameter of the upper part of the operating member is such that it forms a close but slidable fit in the cylindrical chamber 16 above the measuring chamber.

The base part 2 of the measuring chamber has a downwardly extending cylindrical extension 30 over which slides a sleeve 31 carried upon the arms 12. Within the extension 30 an annular closure member 32 is fixed and between the closure member and a shoulder 33 on the part 2 is fixed a resilient washer 34 which makes wiping contact with the surface of the operating member in known manner to retain any liquid which tends to leak down the surface of the operating member. The washer 34 is movable within a double conical chamber 35 formed between the part 2 and the closure member 32. A spring 36 is interposed between the arms 12 and the closure member 32 to restore the parts to the positions shown in Fig. 1 after operation.

The operation of the measuring device above described is as follows:—

When the device is at rest free communication exists between the bottle or other reservoir of liquid and the measuring chamber which is filled with liquid. When the operating member 11 is moved upwards its head 29 enters the cylindrical chamber 16 thereby substantially cutting off the supply of liquid to the measuring chamber, this position being shown in Fig. 2. Further movement of the operating member brings its chamfered head 29 into contact with the rounded inner end 26 of the valve stem 20 which is thereby moved axially outwards to move the resilient valve component 23 off its seating and thereby open communication between the interior of the measuring chamber and the atmosphere through the two ports 17 and 19 and the valve chamber 18. The last part of the travel of the operating member 11 brings its ports 27 above the level of the base 13 of the measuring chamber and allows the liquid to flow out, through the passage 28, this position being shown in Fig. 3. Also, during the last part of said travel the head 29 of the operating member makes contact with the base of the inlet passage 7 and thus makes the measuring chamber doubly secure against inlet leakage during the discharge operation. When the pressure of the receptacle charged is removed the operating member is restored to its initial position shown in Fig. 1 by the spring 36.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A device of the kind described for delivering measured quantities of liquid including an air inlet valve actuated by upward movement of an axially movable operating member wherein the inner end of the air valve stem projects into a second chamber formed above the measuring chamber, and the said second chamber which constitutes the liquid inlet to the measuring chamber being closed by initial movement of the operating member which then engages and operates the air inlet valve stem to establish communication between the measuring chamber and atmosphere.

2. A device of the kind described for delivering measured quantities of liquid wherein an axially movable operating member is arranged during its upward movement first substantially to close the liquid inlet to a measuring chamber, secondly to operate an air inlet valve which with its operating element is disposed externally of the measuring chamber, and lastly to allow discharge of a measured quantity of liquid substantially simultaneously with a complete closure of the liquid inlet.

3. A device according to Claim 1 or 2 wherein the head of the measuring chamber terminates in a portion of narrower diameter in which the head of the operating member is adapted to enter to effect substantial closure of the liquid inlet and in doing so to cause lateral movement of an air inlet valve stem to permit air to enter the main portion of the measuring chamber.

4. A device according to Claim 3 wherein continued upward movement of the operating member after opening of the air inlet valve causes the upper end of the operating member to seal the lower end of a liquid inlet passage substantially simultaneously with the discharge of liquid through ports in the operating member brought into communication with the interior of the measuring chamber by the upward movement of the operating member.

5. A device according to Claim 1, 2, 3 or 4 wherein the upper part of the measuring chamber consists of a detachable portion normally retained in sealing engagement with the lower portion, the said

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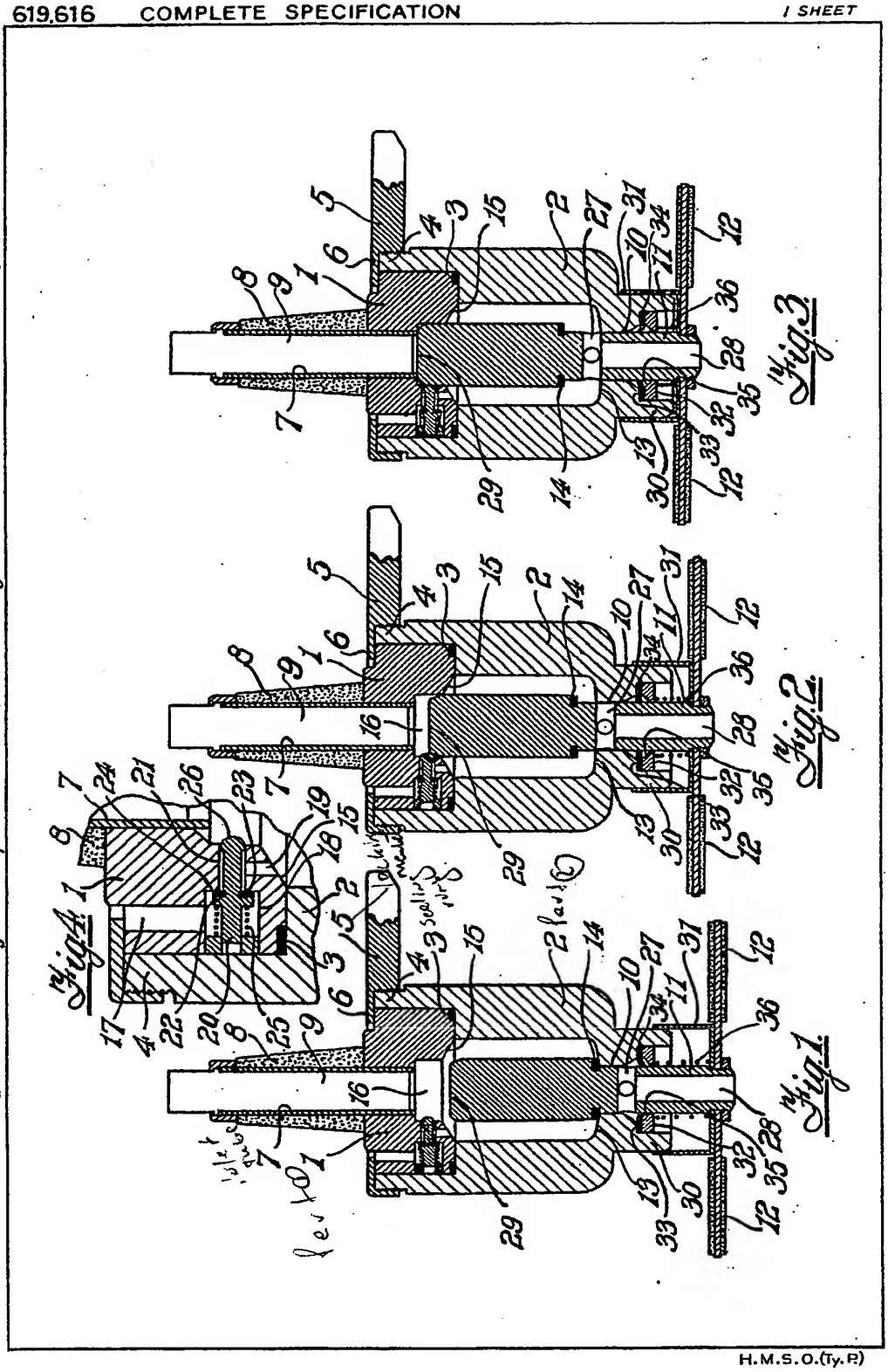

Fig.3

Fig.2

Fig.4

Fig.1

H.M.S.O.(Ty.P.)

upper portion being formed with an air inlet valve chamber having ports communicating with atmosphere and with the interior of the measuring chamber.

6. A device according to Claim 3, 4 or 5 wherein the inlet valve consists of a stem movable on an axis substantially at right angles to the axis of movement of the operating member, the said stem having a portion of reduced diameter, a flange with a resilient member thereon forming a valve member adapted to engage a seating formed at one end of a valve chamber and being normally urged by a spring in an inward direction to seat the valve member and cause the inner end of the stem to project into a cylindrical chamber into the path of movement of the operating member.

7. A device according to the preceding Claims or any of them wherein the lower portion of the operating member carries a sealing member adapted to engage a seating in the base of the measuring chamber and has transverse ports communicating with a central discharge passage.

8. A device according to Claim 7 wherein the said operating member is returned to inoperative position by a spring and is engaged by a resilient element to prevent leakage down its sides.

9. A device according to Claim 5 wherein the upper part of the measuring chamber has a tubular inlet passage secured therein and is provided with means for making a liquid-tight connection with a bottle or other receptacle from which supplies of liquid are to be intermittently withdrawn.

10. A device for delivering measured quantities of liquid constructed, arranged and adapted to operate as herein described with reference to the accompanying drawings.

Dated this 18th day of November, 1947.
HERON ROGERS & CO.,
Agents for Applicants,
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